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# TRADITIONAL

MARINE RESOURCE MANAGEMENT AND KNOWLEDGE

INFORMATION BULLETIN

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## NOTE FROM THE CO-ORDINATOR

Membership of the Special Interest Group is beginning to increase, and there has been considerable useful feedback to the inaugural issue, particularly from outside the region. But we would like many more active members, so please circulate your copy of the Information Bulletin, and ask people to register their interest in the Special Interest Group on Traditional Marine Resource Management and Knowledge with the South Pacific Commission. Please use (and copy and circulate among your colleagues) the questionnaire at the back of this issue, and send it directly to Jean-Paul Gaudechoux, at SPC, Noumea. The full address is on the questionnaire.

In response to requests for practical assistance in conducting surveys and in-depth studies of traditional marine resource management systems and the traditional knowledge that underpins them, this issue includes two papers. One, by Andrew Smith, discusses strategies for acquiring traditional marine knowledge. The second, by Anthony T. Charles, describes information needs and analytical techniques for economic research in small-scale fisheries.

Comments on these papers, requests for further information, or requests for help to examine particular problems, could be published in future issues of this Information Bulletin. However, routine follow-up is best sent directly to the authors. (contd p.2)

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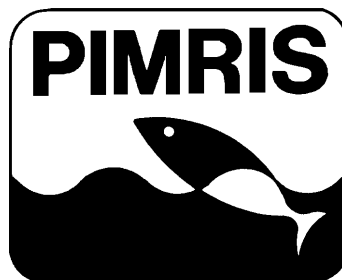
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PIMRIS is a joint project of 4 international organisations concerned with fisheries and marine resource development in the Pacific Islands region. The project is executed by the South Pacific Commission (SPC), the South Pacific Forum Fisheries Agency (FFA), the University of the South Pacific's Pacific Information Centre (USP-PIC), and the South Pacific Applied Geoscience Commission (SOPAC). Funding is provided by the International Centre for Ocean Development (ICOD) and the Government of France. This bulletin is produced by SPC as part of its



Pacific Islands Marine Resources Information System

commitment to PIMRIS. The aim of PIMRIS is to improve the availability of information on marine resources to users in the region, so as to support their rational development and management. PIMRIS activities include: the active collection, cataloguing and archiving of technical documents, especially ephemera ('grey literature'); evaluation, repackaging and dissemination of information; provision of literature searches, question-and-answer services and bibliographic support; and assistance with the development of in-country reference collections and databases on marine resources.

We would, nevertheless, appreciate copies of any correspondence that is relevant to the interests of group members and that we could include in future issues of the Bulletin (with your permission, of course). Please send any copies of correspondence to myself or to J.P. Gaudechoux at SPC.

We hope to continue to publish such 'practical' papers in future issues. Any suggestions for topics, and, in particular, contributions, will be most welcome.

Moses Amos, of the Vanuatu Fisheries Department, contributes an informative paper on the vital modern role of traditional marine resource management in a trochus re-seeding programme. Our hope is that his paper will stimulate other such contributions from Pacific Island fisheries departments.

We have also included a 'request paper' from ICLARM (International Center for Living Aquatic

Resources Management, based in Manila, Philippines) for contributions from the region to their FISHBASE computer database project. I have been very impressed with how FISHBASE has developed over the last two years, and urge anyone with access to any form of relevant material to set about contributing. (Incidentally, although the authors don't say so, they will reimburse you for mailing and photocopying charges, against receipts!)

Finally, there are a couple of reports of conferences in the region held during 1992, and a notice about the 4th Annual Common Property Conference of the International Association for the Study of Common Property (IASCP), to be held in Manila June 16-19, 1993. Please note that the IASCP will try to assist with securing travel funds (but please contact the organizers directly!).

Kenneth Ruddle

## Strategies for acquiring traditional marine knowledge

*by Andrew Smith  
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The strategies required for documenting ethnobiological information, as opposed to specific techniques, often receive minimal attention. Here I outline some of the strategies that I, as a marine biologist, have used to elicit and verify traditional marine knowledge under differing circumstances. I do not explain specific techniques, as these can be found in the anthropological literature. To a large extent both techniques and strategies depend on the factors surrounding the project and the researcher's personal preferences and experience.

In an ideal situation the recording of traditional marine knowledge should be done by people who have biological and anthropological training and are preferably from the culture concerned. However, it can be argued that it is possible for interviewers who come from within the culture being studied to overlook valuable information through being too familiar with the subject. What to them may seem insignificant — especially if something is deemed 'common knowledge' — may be of considerable value in relation to the objectives of the project concerned. Ideally, the research team should include:

- researchers with local knowledge and others with an 'outside' perspective;
- people with biological and anthropological training and experience;

—both male and female researchers.

The team should have adequate funding and adequate time to achieve its objectives.

Unfortunately, with today's economic climate the ideal situation will rarely be achievable. Current economic realities usually require projects to be completed with minimal funding, in too little time, with minimal staff and logistical support, or some combination of these problems.

In all situations where traditional marine knowledge is to be elicited, the objectives of the work must first be clearly identified, as these, in conjunction with the 'realities' noted above, determine the research strategy to be used. The following examples of strategies for documenting traditional marine knowledge were determined by differing objectives, cultural situations and logistical circumstances.

The first case involved documenting the marine ethnobiological knowledge of two Australian Aboriginal communities. Although this was primarily for my PhD thesis, there was also an applied objective: to provide the Great Barrier Reef Marine Park Authority (GBRMPA) with management recommendations relating to Aboriginal fishing and marine hunting. In the second case I was employed to record the traditional fishing and management

methods used in the outer islands of Yap State, Federated States of Micronesia, for the State Government's Marine Resources Management Division (MRMD). In the third case I was responsible for developing a marine resources and coastal management plan for Yap State that incorporated its two distinct traditional systems. In the first case I worked alone; in the second I had a partner, but we divided the project geographically (which also meant culturally) and hence conducted our field work separately; and in the third case I had to oversee both outside consultants and local MRMD staff to obtain information relevant to the development of the management plan.

### Case 1:

The objectives of this study were to document the ethnobiological knowledge and the marine hunting and fishing practices of the Hopevale and Lockhart River Aboriginal communities. Additionally, there was an applied objective that dictated both the communities chosen and the focus of the study. The GBRMPA required recommendations that could be used to develop a management programme for the usage of marine resources, especially dugongs and turtles, in the areas of the marine park adjacent to the Aboriginal communities.

The objectives, circumstances (PhD and GBRMPA contract) and logistical situation resulted in the following strategy:

- a full time study;
- one primary community and one secondary community (for comparative purposes);
- long-term fieldwork in the primary community (16 months), with a shorter period in the secondary community (3 months);
- adequate funding;
- one researcher; and
- a general study, but with specific applied management objectives.

The fieldwork involved the collection of biological data and specimen material as well as the ethnobiological information. Only the latter will be considered here. The fieldwork involved two phases.

The first involved developing the necessary rapport with the community and gathering certain basic anthropological information. This included data on household composition and genealogical links, cooperative networks operating in marine

resource exploitation, and place names and site locations relevant to the project. This phase was also used to assess the informant pool.

The second phase of field work involved more intensive and directed interviewing. The general informant pool consisted of approximately 48 men and five women, although the key informant pool comprised only ten men. The formal interviews were based on the development research sequence outlined by Spradley (1979, 1980), whereby a series of descriptive, structural and contrast (verification) questions were asked over an extended period of time. Informant reliability was tested by asking two series of questions on fishing or on the biology of fish or other animals: (a) questions to which the answers were already known and (b) plausible questions to which the informant could not possibly know the answers (this technique is discussed in Johannes, 1981).

This information, in combination with historical records, was used to reconstruct former systems of marine resource exploitation. Considerable time was also spent in the company of Aborigines on fishing and marine hunting trips. This aspect of the field work was based largely on the method of participant observation (see Spradley, 1980). I was an active participant in order to check on the validity and reliability of the information derived from interview materials.

As with any cross-cultural research there were problems. With care these were minimised, but not eliminated. Some problems commonly encountered in ethnobiological field work are:

- Problems of differing cultural perspectives. For example, the notion of conservation and its resultant management regimes is often perceived differently, if at all, by different cultures.
- Cultural obstacles. Some information relating to fishing is considered confidential or secret by the owners of that knowledge. Knowledge often represents power and status to the owners; its disclosure could weaken that position.
- Traditional knowledge of the marine resources may not be complete. It may also be influenced in various ways by social or religious beliefs, European contact, and the impact of modern technology.
- At times the 'culturally correct' information on fishing methods supplied during interviews may be markedly different from what actually occurs in practice.

- The degree to which fishing activities are influenced by the presence of a researcher can be difficult to determine.
- Being associated with government agencies, especially those that are also involved with enforcement, tends to have a negative effect on informants.

In this particular case, my major difficulties stemmed from being indirectly associated with a government agency and by working in a 'fourth-world' community. As I was from the dominant culture, informants were understandably more reticent to divulge knowledge, and considerable time was required for a rapport to develop. This was compounded by my association with GBRMPA.

#### Case 2:

The objectives of this study were to document the traditional knowledge of the marine environment, fishing methods, marine resource management, utilisation of marine resources, and marine folk knowledge for the Yap State Government's Marine Resources Management Division. As Yap State includes two distinct cultural groups — the Yapese and the Caroline Islanders ('outer islanders') — and as my co-researcher was familiar with Yapese culture and language, we divided the field work responsibilities geographically and hence culturally. There were no specific **applied** objectives for the study.

The resultant strategy for the 'outer islands' field work involved:

- a full-time study;
- working on nine remote atolls and islands;
- short-term fieldwork at each location: periods on each atoll ranged from 4 weeks to 4 months, with the average about 5 to 6 weeks, and were determined by the schedule of the inter-island vessel;
- minimal funding;
- one researcher;
- a general study with no applied objectives.

Prior to beginning the fieldwork, considerable time and effort were spent discussing the project with the relevant authorities, especially the Council of Chiefs. It was decided to begin fieldwork on the highest-ranked islet of the highest-ranked atoll.

Although this took longer to arrange in the short term, it facilitated access to and cooperation from the chiefs on the other atolls in the long term.

Owing to the brief time available on each atoll an open-ended questionnaire and checklist were used during directed interviews. This standardisation permitted comparison between atolls of the information collected. Upon arrival at each atoll a meeting would be held with the chiefs and other men. The objectives and proposed work plan would be explained, and any questions or problems addressed.

Formal interviews were conducted with four or five men appointed by the chiefs and elders as being recognised to be experienced and knowledgeable about fishing and marine resources. These men, along with a translator/field assistant, were paid for their time while working on the project.

Again a series of questions, similar in form to those used to verify informant reliability in the first case, was interspersed throughout these interviews. In addition, careful observations were made of the reaction of the individuals within the group as, since questions were answered by communicating through a translator, I had more time to take note of the informants' body language. After the interview I would discuss any adverse reactions with the translator, and if necessary, arrange a private interview with any dissenting informant. When knowledge was identified as specific to one islet within an atoll, or where management and boundaries were involved, specific trips were made to obtain that information from the islet in question.

Whenever possible time was spent observing and participating in fishing activities. This allowed verification of interview material, as well as the documenting of any differences between the theoretical descriptions of fishing methods and those used in practice.

Most of the information obtained during this study was of a general nature — that which was available to most males in the community. This was partly a result of the limited time available at each atoll, and partly associated with the limiting nature of using a questionnaire and checklist technique. But it related principally to the ownership of knowledge. In those islands specialised knowledge is more often than not only divulged to family members on a 'need to know' basis.

One of the significant problems with this strategy — targeting a number of locations, for short times, eliciting the same information — was not to double

guess answers to questions that had been answered with identical information at all previous atolls. Occasionally there were slight variations that could easily have been missed.

### Case 3:

The third example involves the documenting and use of traditional knowledge and management systems for an applied purpose. The Yap State Government wanted a marine resources and coastal management plan prepared for the state. The goals of the plan were:

- To maintain Yap State's marine resources and coastal ecosystems in the best possible condition for future generations;
- To obtain the maximum environmentally sustainable benefits from the multiple use of the coastal resources for traditional, subsistence and development activities;
- To support and enhance the traditional resource management and marine tenure systems, so as to be effective in resource control;
- To provide appropriate marine environmental education to the public; and
- To provide a review process for making wise decisions about coastal resource use.

Considerable public participation was involved in the development of the plan. Input was sought from representatives of the state government, traditional leaders, and the community at large. This was accomplished through meetings with villages, traditional leaders and government personnel to inform them of the plan's development and to gain their input. Open workshops focusing on critical aspects of the plan's development were also held.

Of particular importance to the plan was the consideration of traditional knowledge, uses and customs, to ensure that the plan would be relevant to the cultural systems. The strategy adopted to achieve that involved:

- Part-time work;
- Working in ten Yapese municipalities as well as the outer islands;
- Short meetings, interviews and workshops;
- Minimal funding;

- Team, including one short-term consultant and MRMD staff members;

- Applied study with set objectives.

The need to incorporate customary marine management practices into the plan raised a number of questions: What are the customary marine management practices? How are they **currently** perceived by the community? Will they be effective in the face of present and future economic development? How could we account for the **dynamic** nature of customary practices? How could the two different social systems be included in the plan?

To resolve those questions we needed to know what the customary marine management and usage practices **were**, as well as what they are **currently** perceived to be, and in what form they are practised at present. MRMD had previously contracted the Yap Institute of Natural Science to document the traditional fishing and management practices of the State (see Case 2, above), and, although not in a final form, that information was used extensively in the plan's preparation.

The short-term consultant was given the task of assessing the **present** state of Yap's reef fishery management systems, especially in terms of the 'traditional' structure of authority and how it was coping with social and economic changes.

This study was to provide ideas for reinforcing or modifying that structure, and coordinating the respective roles of 'traditional' and 'modern' management systems. The information was obtained through interviews with municipal and village leaders and other village members over a four-month period. Information was also obtained from published and unpublished accounts of previous studies.

A number of problems were encountered with the strategy used. First and foremost was how time-consuming it was to arrange meetings and interviews with the relevant villages and leaders. These meetings were often postponed for various reasons, for example for funerals or other village matters. The village meetings usually had to be organised out of work hours to permit government workers to attend. This was compounded by the MRMD having insufficient staff (experienced or otherwise) to permit full-time work on the plan. All staff involved had numerous other projects, programmes and work commitments to attend to simultaneously.

The lack of trained and experienced staff who were familiar with **both** the traditional and western systems was another obstacle. This was partly why an outside consultant was used for some of the work. Such short-term consultants, although sensitive to the customary system, can rarely obtain a complete understanding of it. The use of local counterparts was necessary, but again, owing to work commitments, they were not able to work full-time with the consultant.

The problem of having specific applied objectives meant that it was not possible to follow interesting topics when they arose. The time factors, combined with the information being collected by a number of people, meant that I was unable to follow up details as occurred with the two previous cases. This project needed an overall perspective and could not afford to become tied down with details, however interesting they might.

For a number of reasons the codification of the customary management systems was not attempted.

**First**, customary management systems usually only function within their cultural environment. Owing to the dynamic nature of the cultural environment, trying to link future marine resource management to a static structure — codified traditional laws — while the rest of the culture is changing would result in an ineffective management regime. By codifying customary marine management practices they would essentially be severed from the cultural environment upon which their effective existence depends.

**Second**, codification would further hinder the ability of the customary system to adapt to introduced fishing methods and technology.

**Third**, in the case of Yap, there was no consensus as to exactly what the customary marine management systems are perceived to be at present, and codification would therefore have been a very complex and time-consuming task.

This is not to say that MRMD has not attempted codification of some traditional management information, or will not attempt to do so in the future — for example in the mid-1980s, MRMD attempted to document the marine resource boundaries of Yap — just that with our time, financial and personnel limitations we felt justice could not be done to the task. In the mid-1980s, MRMD attempted to document the marine resource boundaries of Yap.

The final report was, however, rejected by the council of chiefs, in part, as it was deemed incomplete. The fishing and reef ownership rights are extremely complex in Yap, with multiple layers of different use rights. The report only documented one of those layers, and even that was at times in dispute. For the use rights boundaries to be successfully codified would take a number of years of full-time work.

### Discussion

In general terms there appear to be two basic strategies for acquiring marine ethnobiological knowledge:

- Short-term studies focusing on specific species or topics, often in a number of locations; or
- Longer-term, more generalised studies aimed at recording as much information as possible on numerous topics and species in only a few locations.

Both strategies have advantages and disadvantages.

One argument in favour of the longer-term, more generalised approach is that because the environmental knowledge of many groups has not been recorded and is being quickly lost, a high priority should be attached to recording it as soon as possible. For this to be done properly requires considerable resources. Additionally the researchers involved need to have enough specialist knowledge to be able to recognise and follow-up significant information when it arises.

A problem with long-term studies in one location is that they may seek to document marine knowledge sets that are possibly not there, or may be incomplete. The cost-effectiveness of such a study would be questionable.

The advantages of a research strategy involving working on specific topics or species in a number of locations, using relevant expertise (biologists, anthropologists, etc) include:

- A more efficient and cost-effective use of field research time;
- Acquisition of more detailed data on specific topics by combining the respective areas of expertise; and
- The ability to assess the potential of a location for a long term study.

The major disadvantage of this strategy is that other valuable information may be missed. It is also more difficult to establish a good working relationship with informants.

As both research strategies have their advantages and disadvantages, it is apparent that the type of approach used should be based on:

- The type of objectives, e.g. biological, management or conservation orientated, ethnographic or historical, or a combination of these;
- The type of resource involved, e.g. single species, whole ecosystem;
- The degree to which the marine knowledge has been altered or affected by westernisation, discontinuities, etc; and
- The level of support and expertise available.

There can be no set formula applicable to all situations. Each of the above problems needs to be assessed and an appropriate strategy, or compromise in strategy, applied. In assessing each situation the effects of the strategies on the people who own the knowledge must be considered, and their wishes incorporated.

Where the acquisition of ethno-biological knowledge is primarily for management and conservation reasons, then a different strategy may be required than for specific biological objectives. Where both biological and management objectives have been set for a study, it would be beneficial to prioritise them before devising an appropriate research strategy.

The specific detail sought for biologically orientated work may not be necessary for management purposes. First, the management problem needs to be clearly defined. Does it involve a single community or a number of communities? Does it involve more than one culture? Does it involve a single species, a number of species, or a whole ecosystem? Second, it should be determined if the work should be carried out by a biologist. For example, if it involves documenting traditional use rights and boundaries, these may be more appropriately documented and mapped by an anthropologist in consultation with a biologist.

When management of an exploited resource is considered, it should be remembered that it is the exploiters who are being managed, not the resource. Therefore, of prime importance in a management orientated ethno-biological study is the

establishment and maintenance of a rapport with the informants and community involved. The brief focused studies applicable to the acquisition of biological information would not be appropriate under these circumstances. The amount of time required would depend on the management problem to be addressed and the community or communities involved. At all stages the informants and community should be involved as much as possible.

Because of the dynamic nature of cultures, ethno-biological studies can provide data relevant only to the period in time when the study was carried out. For management purposes, it would not be appropriate to base contemporary management decisions on a study carried out, for example, ten years ago. However, short-term studies tailored to contemporary management needs could be used to update any previous studies to avoid out-of-date information. When acquiring marine ethno-biological knowledge for conservation purposes, not all traditional knowledge is necessarily conservation-oriented, and of that which may be classed as conservationist, not all may be relevant to the current circumstances. Each situation needs to be evaluated on its own merits.

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## The Nepoui conflict in New Caledonia

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### Introduction

For more than a year now, Northern Province fishermen have been objecting to the presence of professional fishing boats from Noumea (which is in the Southern Province) in the lagoon waters located between Le Cap and Franco on New Caledonia's west coast.

They fear overfishing and are critical of the techniques being used because they think they are damaging. Their opposition has been voiced in various petitions to the Northern Province Fisheries Department and the Office of the Mayor of Poya *Commune*, under whose administrative jurisdiction they fall<sup>1</sup>.

The dispute flared up when the Northern Province Fisheries Department was about to renew current professional fishing permits, not only for fishermen resident in that Province but also for non-residents whose boats were based there<sup>2</sup>.

The latest petition had become an ultimatum: the Noumea professional fishermen had 48 hours to get out, otherwise the 'Kanak police' would take the matter into their own hands. The petition also stipulated that only professional fishermen with at least 10 year's residence in Nepoui should be allowed to fish in the area between Le Cap and Franco. A truce now prevails however and a compromise has been found which is to be submitted to the Customary Council of the *Grande Chefferie* (High Chiefdom) of Mueo (on 18 March 1993).

The Nepoui affair is not an unusual incident in New Caledonia. Kanak fishermen from the South, the North and the Islands have for some years been disgruntled with professional fishermen from other areas using the lagoon waters which, in 'custom', are their maritime territory but which, under French law, may be fished by all legally applying parties who comply with the rules. Boarding of undesirable fishing boats has often been one way of addressing this issue<sup>3</sup>. But more radical treatment is also sometimes meted out (rifle shots) with results which are unlawful but do secure exclusive enjoyment of the lagoon waters...

Three aspects of this particular conflict can however be considered unprecedented: the identity of the protagonists, the way the conflict was addressed and the legal context in which it should be analysed.

#### 1. The identity of the protagonists:

The local fishermen's claims come both from Kanak fishermen who are the 'traditional' owners and users of this piece of maritime territory **and** from some of the fishermen from the European village of Nepoui, which situation to my knowledge has never before arisen in New Caledonia. On the Kanak side, the leaders are fishermen from the *tribu* (village) of Nepu, in which the Vujo clan is responsible for the maritime territory of the High Chiefdom of Mueo, situated between Le Cap and Franco, supported by four other *tribus* belonging to the same High Chiefdom<sup>4</sup>.

<sup>1</sup> Constitutionally speaking, New Caledonia is a French Overseas Territory (TOM). In September 1988, under an agreement known as the Maignon Accords between the main local political leaders and the French Prime Minister, three federated Provinces – the Northern, the Southern and the Islands Provinces – came into being, and the respective responsibilities of the State, the Territory, the new Provinces and the Communes were set out (the *Commune* – there are 32 in New Caledonia – is the basic French administrative unit. Nepu and Nepoui come under the jurisdiction of the *Commune* of Poya).

<sup>2</sup> Fishing permits in New Caledonia are valid for the Territory as a whole. Since the Referendum Act, the three Provinces have been empowered to issue these (previously this was a Territorial responsibility). But the various powers of each Province are not clearly specified and only under a tacit agreement between the Fishing Department of each of the three Provinces are these permits issued only to fishermen whose boats operate in their waters. In other words, nothing can legally prevent a fisherman from taking his Southern Province permit and going fishing in the Northern or Islands Provinces.

<sup>3</sup> A relevant example for the Southern Province is the Isle of Pines conflict in March 1991 and the St Jean Baptiste (district of Borendi) conflict in November 1991; a similar incident occurred at Tiga in June 1991 in the Islands Province, while the Northern Province had experienced the Yaade conflict in previous years. Other disputes arise on occasions between Kanak fishermen from the same area but of different origins (cf. Nepu) or from neighbouring areas. However these 'internal' conflicts have not to my knowledge so far erupted on the same scale as the present one with the Southern Province professional fishermen and they are resolved by the fishermen themselves without the involvement of the public authorities.

<sup>4</sup> The High Chiefdom of Mueo includes 5 *tribus*: Nekiriaï-Karaji in the valley, Montfawe, Goapin, Netea in the hills and Nepu on the shore. Nepoui village is also situated in the maritime area between Le Cap and Franco, a few kilometers to the North of Nepu. It is a mining village involved in the nickel trade with a population of over 800 (statistics from Poya Mayor's Office).



From Nepoui village, the claims are been pushed by a non-Kanak fisherman, Mr M., who has also been elected as the representative of the fishermen from this area within the Fisheries Consultative Council of the Northern Province<sup>5</sup>.

He is clearly interested in defending his business (he owns a boat and employs a fisherman to operate it) and therefore encourages the Kanak fishermen to object to professional fishermen coming in from outside.

Since he represents the local 'white' population, the Kanaks have something to gain in backing him for membership of the Consultative Council and in agreeing to be represented by him in this conflict, since his representation consolidates the aspirations of both communities. But it is clear that their interests diverge outside the scope of this dispute.

The rest of the Nepoui fishermen largely fall into two groups, some of whom, like Mr M., do not wish to share their resources with outside fishermen, and others who are locally employed by fishing boat owners from Noumea. The jobs of the latter clearly depend on a compromise being found. The situation is therefore a complex one and there are conflicting interests at play.

## 2. The way this type of fishing rights' conflict was addressed:

For the first time – according to the protagonists – the representatives of all the parties concerned met on the invitation of the Northern Province Fisheries Department. Kanak and European (and also Wallisian, etc...) fishermen, both professional and non-professional, representatives of the Poya Mayor's Office, the Northern Province through its Fisheries Department, the 'Gendarmerie' (responsible under French law for the surveillance of the maritime territory, but not equipped with a boat in this area) met to put their points of view – sometimes in no uncertain terms – and managed to reach a compromise at the end of the second meeting.

Apart from producing a solution to the immediate conflict, these meetings clearly enabled the protagonists to make a number of remarks which had apparently never previously been exchanged, because local society did not offer any appropriate occasion or venue.

## 3. The legal context in which this conflict should be analysed:

One of the factors revealed by this conflict is the wish of local fishermen to exercise some kind of control over the management of the maritime zone and its resources.

This takes the form of a rejection of outside fishermen, particularly those from beyond the Province, thus creating a kind of Northern Province-Southern Province antagonism<sup>6</sup>. And this is not the first time that such an 'us-against-them' attitude has emerged in the fisheries sector.

On another level, the legal controversy between the Northern and Southern Province which is at present in full swing over crab fishing (for *Scylla Serrata*) also reveals the need for greater legal autonomy between two Provinces at unequal levels of development.

This conflict over crab is worth mentioning because it marks an important stage in the administrative evolution of the Northern Province, through and within the fisheries sector.

Until 1990, the Territorial Congress authorised crab fishing for six months each year, providing specimens were over 13 cms in size<sup>7</sup>.

The regulations then changed and the minimum size was increased to 15 cms. These regulations suit neither of the Provinces (for different reasons) and the Territorial Marine Resources Committee agreed that the law required amendment.

The Northern Province – which accounts for 80 per cent of crab production – recommended reducing

<sup>5</sup> The Fisheries Consultative Committee is a body established by the Northern Province (Resolution dated 22 November 1991). It includes representatives of individual professional fishermen and associations of fishermen, representatives of fish-traders, restaurateurs, women's associations, consumer associations, professional associations, the President of the Northern Province and an official from the Fisheries Department. It gives its opinion on the various problems which arise in the fisheries sector in the Province but has no decision-making powers.

<sup>6</sup> Apart from not being legal, this rejection of the Southern Province fishermen could prove harmful to the Northern Province fishermen's interests. Most of the landings are taken to the Noumea market and reprisals would no doubt very quickly be taken.

<sup>7</sup> These data come from the daily newspaper 'Les Nouvelles' dated 5.11.1992.

the minimum size for crabs to 14 cms and that the fishing season be opened for eight months each year. Its arguments were that a 15 cm crab was old and had an unpalatable flavour, that crabs of this size were becoming too rare and that this encouraged the preparation of shelled crab meat, tempting people to offend because it was difficult to check on what was happening.

The Southern Province asked for a minimum size of 15 cms and a ten-month fishing season, so as not to hinder the restaurant, hotel and tourism trades. The Marine Resources Committee, since it is dominated by the same political majority as the Southern Province, approved legislation along the lines preferred by that Province.

The Northern Province therefore decided to legislate for itself and approved proposals within the Provincial Assembly, adding a ban on crab meat sold out of the shell. To justify its position, it put forward the argument that the Territory may have jurisdiction over animal-related matters, but that the Provinces are responsible for environmental conservation, and that they cannot exercise that responsibility without 'policing' it. In response to this legislative 'revolt', the Northern Province currently faces legal proceedings by the Territory and the French State.

The stakes are high: if the Province is acquitted, this

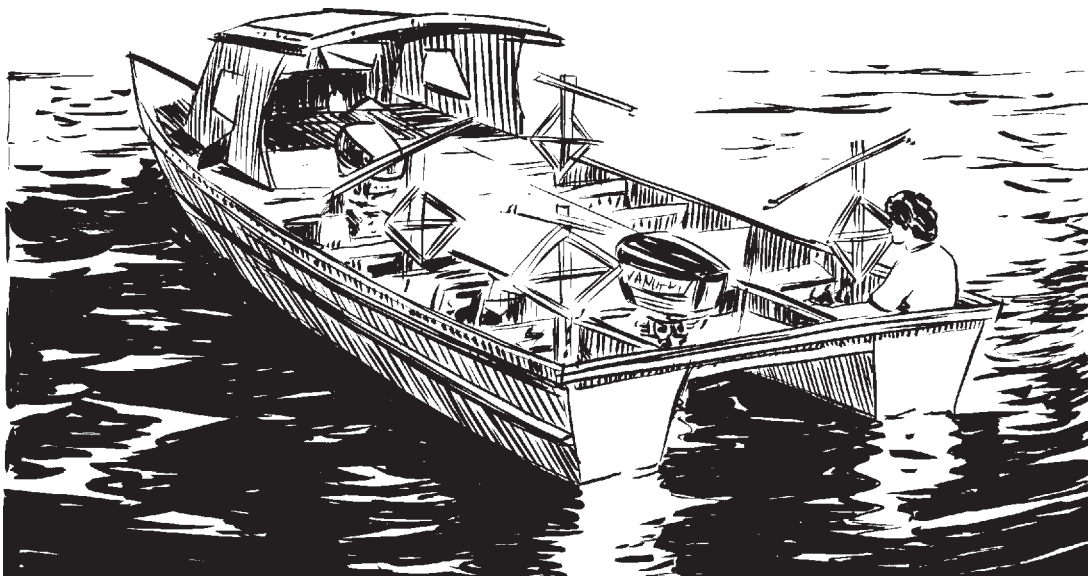
would create a significant legal precedent. If it is found guilty, it would still be able to use its responsibility in environmental matters to protect its resources, and this could go as far as declaring the whole of the Northern Province a marine reserve. Such is the general legal background to the Nepoui conflict.

### Conclusion

The Nepoui conflict would appear to be on the way to being resolved. The compromises accepted have been shaped by specific local circumstances.

But the problems raised by this conflict – the degree of autonomy of fishermen in the management of their maritime territory, the definition of the rights and responsibilities of each party, development and/or protectionism, circulation of scientific, technical and 'traditional' information, means of surveillance and protection (establishment of reserves...) and user monitoring, etc... - have a much wider import.

They reveal the fact that ad-hoc solutions will not prevent other conflicts arising and being-or not being-resolved until such time as these fundamental problems are addressed with due regard to all the circumstances, both by local protagonists and by the judicial and political authorities.



## Information needs and analytical techniques for economic research in small-scale fisheries

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The essence of economics lies in addressing the so-called 'economising problem': how to maximise overall satisfaction through the efficient use and management of limited resources (including labour, capital, technology, and natural resources). In other words, how can we achieve the most benefits for the least cost? From a societal perspective this is not without its complexities. Should 'satisfaction' be measured relative to 'wants' or 'needs'? Should future needs receive equal weight to those of the present? Should non-material as well as material aspects be considered? These questions are by no means trivial, and attract plenty of attention among all sorts of economists. Nevertheless, the key idea of managing resources to achieve 'maximum satisfaction' (however measured) remains at the centre of economic thinking.

In the present brief discussion, no attempt is made to repeat or even to summarise all the existing literature on data needs and analytical methodologies in fishery economics. Instead, I will merely outline the categories of economic questions that arise in small-scale fisheries, the tools used to address those questions, and some relevant considerations in collecting information and conducting economic analysis within the fishery context.

The rather diverse toolkit used by economists in attempting to quantify and address the economising goal seeks to provide:

- the means for understanding economic aspects of fishery operations, including the harvesting processes, processing and other post-harvest activities, marketing and consumer demand;
- a suitable set of techniques for analyzing economic data, modelling policy options, and formulating appropriate management and development approaches.

Not surprisingly, most of these tools, the vast majority of which were developed in Northern countries, require large amounts of data. However, it is important to recognize explicitly that the idea of 'information needs' is a relative one. There are no 'absolute' needs for fishery information in the same way as, say, humans have an absolute need for protein in our diet. Although everyone might agree that information is **useful** in management and development, in fact it is not **crucial**. Instead, decisions about the acquisition of information should

be seen as inherently economic in nature. There must be a balancing of acquisition costs and the value of information in improving social 'satisfaction', through some form of 'cost/benefit' calculation. Indeed, there are interesting efforts underway in various fisheries and fishery donor agencies to prioritise information 'needs' through such approaches.

If we recognise that we cannot afford to know everything about a fishery, it becomes clear that most simple listings of information 'needs' are really lists of 'wants'. Not all of these will be of equal importance in any given situation. Nevertheless, it is useful as a starting point to compile a somewhat comprehensive 'wish list' of economic questions which could be important in small-scale fisheries. Table I presents such a list of questions, adapted and extended from material provided by Panayotou in a particularly useful publication, *Small-Scale Fisheries in Asia: Socioeconomic Analysis and Policy* (Panayotou, 1985).

Also indicated in Table I are the various economic methodologies used in addressing questions arising in fishery research. Among these are Lorenz curves and Gini coefficients (for examining income distribution), 'cost and earnings' balance sheets (for analyzing and summarizing the financial picture), production functions and profit functions (for describing input-output relationships), econometric demand analysis and market surveys (for understanding and predicting final consumer demand), and bio-socio-economic management models (for exploring regulatory options).

In examining this variety of techniques, it is useful to note that the study of economics is often 'split' in two predominant ways. First, as in other disciplines such as biology and sociology, economics can be practised through both qualitative and quantitative research. The former often involves verbal reasoning, through socio-economics, 'policy analysis' and case studies, while the latter emphasizes mathematical and statistical methods. Although the 'mathematization' of economics has become fashionable, a full understanding of the complex fishery system undoubtedly requires qualitative as well as quantitative studies.

A second 'split' in economic thinking divides the field into the two clearly distinguished branches of micro-economics and macro-economics. In overly

**Table 1. Economic questions in small-scale fisheries and methodologies for their analysis**

<b>SOCIO-ECONOMIC CONDITIONS</b>	<b>TOOLS AND TECHNIQUES</b>
<p><b>1</b> In broad terms, what are the overall structure, activities and standards of living of small-scale fishing communities and households?</p> <p><b>2</b> How do standards of living of small-scale fishing households differ among households themselves, relative to those of other socio-economic groups (e.g. farmers) and in comparison to the national average? What factors account for these differences?</p> <p><b>3</b> What is the particular role of women in fisheries, and how do gender differences, if any, affect fishery management and development?</p>	<p>Socio-economic surveys are the principal means used to collect community and household data on fishing income and other income sources, distribution of income and wealth, access to capital, cost data, demographic information (such as age and family size), gender roles, etc.</p> <p>In examining income and wealth distribution, two useful tools are Lorenz curves and Gini coefficients. Bio-socio-economic models can address the dynamics of socio-economic processes in fisheries</p>
<p><b>SOCIAL, INSTITUTIONAL AND MACRO-ECONOMIC FACTORS</b></p> <p><b>4</b> What is the relative importance of economic versus socio-cultural factors (such as religion, social organisation of production, and ownership arrangements) in determining fishing behaviour, particularly entry to and exit from the fishery? How does this depend on income levels?</p> <p><b>5</b> How much and how easily does labour move between the fishery and alternative areas of employment? How "mobile" are fishermen, and those in the post-harvest sector, both in occupational and in geographical terms?</p> <p><b>6</b> What impact do macro-economic government programmes (such as the provision of credits to fishermen) have on the economics of both the fishermen and the fishery as a whole?</p>	<p>Socio-economic analysis and case studies (qualitative) and econometrics (quantitative regression analysis) address the relative roles of economics and non-economic factors in the fishery.</p> <p>Labour mobility studies, model of labour dynamics and attitudinal surveys provide insights into the implications of policy options both inside and outside the fishery.</p> <p>Joint macro/micro studies can analyse impacts of both national and international programmes (e.g. structural adjustment), on the fishery within the broader economy</p>
<p><b>PRODUCTION TECHNOLOGY AND ECONOMIC EFFICIENCY</b></p> <p><b>7</b> Why do fishermen operating in the same location catch different quantities of fish? Is it due to differences in the type and size of gear, boat size, engine power, mesh size of net, time spent fishing, or varying degrees of inefficiency in the use of these inputs?</p> <p><b>8</b> What is the contribution of each fishing input to catch? Would a doubling of all inputs double catch?</p> <p><b>9</b> Are operating inputs such as fuel and labour used at their profit-maximising level?</p>	<p>Production Functions, calculated using multiple regression analysis, are often used to describe the relationship between harvest levels and the various fishing inputs. These, combined with cost data, can be used to determine the 'efficient' levels of inputs, and the 'scale economics' that describe the effects of enterprise expansion. Bio-economic models are increasingly used to analyse dynamic aspects of harvesting processes.</p>
<p><b>COST STRUCTURE AND PROFITABILITY</b></p> <p><b>10</b> What are the relative capital and labour intensities of various fishing technologies at different locations?</p> <p><b>11</b> What proportion of total costs is 'fixed' – independent of the day-to-day operations?</p> <p><b>12</b> What is the degree of dependence on credit, and at what cost?</p> <p><b>13</b> How are the total revenues divided between the boat owner and the crew for different types of gear and in different locations?</p>	<p>The 'Cost and Earnings' survey produces economic and financial balance sheets both of individual fishing enterprises and of fishermen groupings (by gear, size, etc...). The variables collected in such a survey may include capital costs, other fixed costs (for annual fees, maintenance, etc.), variable/operating costs, landed values and other income, division of income between crew and boat owner, level of debt and return on investment.</p>

**Table 1. Economic questions in small-scale fisheries and methodologies for their analysis (cont'd)**

<p><b>14</b> Do prices of fish and fishing inputs differ substantially among vessel sizes and among locations to the extent that they have an effect on profitability? How sensitive is the cost structure of various types of gear to fuel price increases?</p> <p><b>15</b> Which vessel sizes, types of gear and fishing grounds are on the average more profitable? What other factors besides vessel size, gear type, location, and prices have a bearing on profit?</p>	<p>Profit functions are analogous to production functions, providing the means to examine profitability as a function of inputs levels, type of boat, cost structure and fish price levels, using empirical relationships derived statistically.</p>
<p><b>MARKETING SYSTEM</b></p>	
<p><b>16</b> What trends are envisioned in the price of fish and of the inputs used in harvesting?</p> <p><b>17</b> To what extent are fish used for subsistence, sold locally, or exported? Is the fishery system relatively self-contained, or dependent on external economic forces?</p> <p><b>18</b> What route does fish travel from the landing site to the consumer, and what is the role of intermediaries in the course of this marketing process?</p> <p><b>19</b> Is there exploitation of fishermen by middlemen, or are the middlemen receiving a 'just' price (the opportunity cost) in return for their service? What are the roles of isolation, immobility, and indebtedness in creating and/or maintaining exploitation?</p>	<p>Econometrics (notably statistical regression) are commonly used to analyse fish demand and predict changes in that demand, while market survey are standard tools used to examine consumer preferences. A key aspect of these analyses is the determination of product substitutes and complements, which requires study of non-fishery and particularly agricultural production.</p> <p>Research on the marketing channels through which fish are distributed is typically carried out through accounting mechanisms for tracking the physical sales, as well as the costs and value added, of the products.</p>

simplified terms, the former deals with the behaviour of 'firms' and consumers, and their market interactions through supply and demand relationships, whereas the latter focuses on the 'big picture' of inflation, unemployment, trade, national accounts, intersectoral interactions, etc. In fisheries, micro-economics is oriented at the level of the individual fisherman, the fish consumer, and the local fishery itself, whereas macro-economics deals with such topics as the relationship between the various coastal activities — fishing, tourism, and industry, etc. — or the dynamics and mobility of labour inside and outside the fishery. Micro-economic studies have typically predominated in the fishery sector, but, as with the qualitative/quantitative balance, a full analysis of fishery options demands both 'micro' and 'macro' studies, particularly in a world in which macro effects invariably impact on options at the micro level.

**Discussion**

This very brief article should be regarded as a comprehensive overview of information and methodology in economic studies of small-scale fisheries. As noted earlier, it is confined to three main points:

- the presentation (in Table 1) of a set of potentially relevant economic questions in small-scale fisheries, and some of the corresponding methodologies for dealing with them;
- a caveat about the need for cost/benefit analysis in assessing information 'needs'; and
- a brief discussion of the nature of economic analysis, particularly the splits between qualitative and quantitative studies, and between macroeconomic and microeconomic approaches.

Much more detailed discussion of these matters can be found in the references on page 11, in the output of such organizations as the International Association for the Study of Common Property and the International Institute for Fisheries Economics and Trade, and in a forthcoming series of International Development Research Centre publications surveying the 'state of the art' in international fishery socioeconomics research. (Contact the author for further details.)

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### Traditionally based marine management systems in Vanuatu

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## Introduction

In Vanuatu increased reliance is being placed on marine resources to support and sustain national development, because land-based mining is non-existent and the agricultural sector could never be productive enough for this purpose. Throughout the coastal area and in adjacent oceanic waters, Ni-Vanuatu and a few foreign interests target marine resources in operations that range in scale from subsistence to industrial.

In Vanuatu, religious, cultural and historical traditions play a modern role that is impossible to over-emphasize. As might be expected of a pastoral and hunting people, much of this tradition is intimately bound up with observation of and reverence for the natural world. As noted in the National Constitution:

*A further major reason for natural resource protection in Vanuatu is the close identification that all ni-Vanuatu feel with the land, their own custom land in particular. Ni-Vanuatu living in a degraded environment will suffer a spiritual or cultural loss with a consequent lowering of the Quality of Life.*

The preoccupation with custom pervades all aspects of environmental management in Vanuatu: 'Everywhere there are taboo areas, cemeteries, old village sites, important rocks and other custom places that need to be protected against damage from development'.

Among the fundamental duties which the Constitution of Vanuatu (Section 7) stipulates for 'Every person.... to himself and his descendants and to others [is]... to protect Vanuatu and to safeguard the National wealth, resources and environment in the interests of the present generation and of the future generation.'

the Acquisition of Socio-economic Information in Fisheries, *FAO Fisheries Report*, No. 344, Rome.

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This statement contains the basic elements of environmental management:

- protection of the environment;
- forms of resource use which minimise social and environmental disturbances; and
- a long-term view of balanced resource development.

## Traditionally based management

This management system is the foundation of traditional, community-based marine tenure. It involves the owners protecting their marine resources from outsiders via self-imposed harvesting restrictions, which may vary from gear restrictions to closed seasons.

## Land tenure

The ownership of inshore waters plus the fringing reef follows from land tenure regulations. Land tenure determines not only access to land, which is a prerequisite for most development projects, but also authority over land, which is a prerequisite for environmental management. In Vanuatu, the significance of tenure goes further, for the relationship to land is a fundamental aspect of Ni-Vanuatu cultures. The Constitution provides that :

*'All Land in the Republic belongs to the indigenous custom owners and their descendants.'* (Article 71, Chap. 12 of the Constitution of Vanuatu); and

*'The rules of Custom shall form the basis of ownership and use of Land in the Republic'. (Article 72, Chap. 12 of the Constitution of Vanuatu).*

### **Reef ownership**

Article 72 of the Constitution can also be interpreted as 'the rules of custom shall form the basis of ownership and use of fringing reefs in the Republic.' Chiefs who own land that extends to the coastline automatically own the coastline plus the adjacent fringing reefs. These chiefs determine the use of the fringing reefs.

Inshore fisheries management requires that attention be paid to traditional rights exercised by customary owners. Some groups claim rights as far out to sea as one can fish or dive for commercial shells. There are even some groups who claim traditional fishing rights out to the horizon. But the Fisheries Department proceeds on the basis that the outer reef edge and beyond represents a realistic limit for customary claims, as laid down by the land legislation.

### **Traditional management, an option for marine resources management**

The increasing demands on marine resources, coupled with the impracticality of Fisheries Officers patrolling all islands to ensure compliance with Fisheries Regulations, mandates that inshore resources be managed locally. Traditional management provides an effective and efficient option for managing inshore marine resources, by returning management responsibility to the chiefs and resource owners.

However, for traditional management to be effective, cooperation is required between the chiefs and the Fisheries Officers. A common error made by Government, then implemented by Fisheries Officers, is the destruction of traditional management systems. This is a result of a complete failure to understand traditional systems. To establish a working cooperative system with the chiefs and the resource owners, Fisheries Officers should not egotistically push their own views on management procedures.

### **Trochus and greensnail fisheries in Vanuatu**

Trochus harvesting in Vanuatu for other than subsistence purposes has a long history. Commercial harvesting of trochus shells and green-snail shells

began in the 19th century. Thus these resources have been influenced by long-term sustained exploitation as well as natural phenomena.

The increasing demand for trochus and green-snail shells, together with the newly elected Government's 'Free Enterprise Policy' has resulted in the establishment in 1992 of a further five shell-processing factories, making a total of 8 in the Port Vila area.

Naturally, this has had the effect of increasing the harvesting pressure on these two species, such that management is urgently required.

### **Dissemination of information**

The pressure to fish trochus and green-snails caused by the competitive prices offered by the shell factories means that it becomes a waste of time trying to direct all our energy to educating only the fishermen. Regardless of how much information a fisherman has, he will always violate the Fisheries Management Regulations when 'fast money' is involved.

Since conservation measures to protect commercial marine gastropods have been continuously violated, the Research Section of the Fisheries Department took steps to find a more effective way of managing the resource.

All reef flats in Vanuatu are owned either by a community, a chief or a tribe. Thus instead of directing all the attention and information toward only the fishermen, the Research Section targeted the resource owners, who, with encouragement and given a sense of responsibility, could play an important role in managing the resource.

The Research Section locates village communities where customary authority over local marine resources remains strong, and where the resource owners are interested in receiving management advice from the Fisheries Department. After assessing their local knowledge of their trochus resources and carrying out 'Trochus Stock Assessment Surveys' in the area, the research team advises the villages on such things as why minimum size limits on trochus are desirable, where trochus re-fuges might best be situated, whether the local trochus fisheries should be closed, and for how long, in order to re-build stocks.

The process is slow and sometimes frustrating. A lot of travelling, talking and practical teaching is involved. Local fishermen are recruited to work on the surveys on each island visited. In this way the fishermen are able to observe and learn from the

Research Officers. Every evening, after each day's diving, the Research Officers arrange for further informal discussions with resource owners and fishermen, about the importance of harvesting of only legal size shells. (These discussions are usually held around bowls of kava.)

So as not to confuse the resource owners, chiefs and fishermen, complicated scientific words or phrases are not used in the discussions. Discussions are kept as simple and informal as possible. The important message that is always the centre of the discussion is that of proper management of the resource and the vital role that resource owners can play in the management.

As part of the education program, a National Trochus Workshop was organised by the Research Section, in June 1991 (sponsored by SPC/ICOD) for chiefs and resource owners, fishermen and Provincial Government Representatives.

The two main purposes of the Workshop were to:

- increase the participants' awareness, knowledge and understanding of the marine resources, biological and economical, and encourage the resource owners to be strict on their traditional management systems; and
- group together the two parties, (i.e., resource owners and Provincial Government representatives) representing the two different management systems, (i.e., traditional and governmental) and explain how the two systems can work together to safeguard the marine resources.

### **The effectiveness of traditional management in a juvenile trochus re-seeding experiment**

No existing fisheries management regulation protects the fieldwork done by the Fisheries Department Research Section from either disruption or vandalism. Thus there is no alternative but to rely solely on the traditional management system and the cooperation of the resource owners and the island chiefs to protect operations. This underlines the importance of establishing a working cooperation and trust with the resource owners and chiefs prior to carrying out any research work.

Trochus aquaculture has been initiated only recently in Vanuatu. The South Pacific Aquaculture Development Project (SPADP) provided funding to examine the feasibility of setting up a small-scale trochus culture facility in Vanuatu. The longterm objective of this was to determine whether re-seed-

ing reefs with hatchery-reared juveniles is a practical tool for management of the wild fishery.

As part of a Regional Trochus Workshop, run by SPC in Port Vila in May 1991, 1,400 juvenile trochus reared at the Port Vila Fisheries Hatchery were tagged and released on a reef flat owned by the people of Erakor Village.

Two months prior to the Regional Trochus Workshop, the research officers held meetings with the Erakor Village Council of Chiefs (EVCC), the Secretary of the Erakor Area Council (SEAC) – Council that looks after the implementation of government policies) and trochus fishermen, to discuss the possibility of using their reef as an experimental site for re-seeding.

It was explained that the purpose of the experimental study was to determine if the release of hatchery-reared juvenile trochus on their reef flat would have a measurable impact on population densities in the natural environment.

It was also explained that prior to the release of juveniles, baseline surveys of trochus population would have to be conducted in the intertidal and sub-tidal zones of the selected reef, to locate natural recruitment areas and to quantify existing juvenile and adult densities.

For these surveys the Research Officers requested help from local trochus fishermen, who would be paid by the Research Section at a rate of 1,500 vatu per diving day.

It was emphasised during the meetings that the success of the experimental study would be of great benefit to the community, but that it would depend entirely on the goodwill and cooperation of the people of Erakor.

The EVCC and the SEAC imposed a two-year taboo on the Erakor reef, from the moment the juveniles were released, and set a fine of 15,000 vatu for any person found diving and collecting trochus shells on the reef, or disrupting the experiment. Radio messages were sent by the SEAC, informing the public and nearby villages of the taboo and fine.

The cooperation of the people of Erakor has been very good. The Research Section continued to liaise with the Erakor Council of Chiefs about the progress of the re-seeding experiment, and recruited two or three local fishermen every two weeks to help with the recapture surveys of the released juveniles.

### **Conclusion**



The difficulties and complexities of facilitating development based on custom have meant that efforts to develop procedures for accommodating community-based marine tenure systems have had to be put aside.

Traditional community-based marine tenure is not, as is widely suggested, necessarily a hindrance or problem in itself. The problem is the apparently irreconcilable gap between traditional and modern concepts of natural resource development and of

financial security, and the difficulty which foreigners have in understanding the true nature and cultural significance of communal tenure.

The Vanuatu Fisheries Department is committed to developing a procedure for marine resource development which incorporates the best of the customary management systems in a modern context. After all, the reality is that when resources are degrading you can't wait for science.

### **On traditional knowledge, fish and databases: a call for contributions**

*by M.L. Palomares, R. Froese and D. Pauly  
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*FISHBASE is a joint project between ICLARM and the Food and Agriculture Organization (FAO) of the United Nations and funded by the Commission of the European Communities (CEC). As of September 1992, a third of the over 20,000 fish species in the world have been entered in FISHBASE. These cover over 80% of the world's fish catch, and include all species used in aquaculture, all commercial species of the North Atlantic and the Mediterranean, most European freshwater species, over 800 African freshwater species, over 1,500 Asian marine species, all freshwater species introduced to another country, all fishes included in the IUCN red list, all marine fishes dangerous to humans, all important game fishes, and more. For all of these species, FISHBASE contains over 8,600 synonyms and over 20,000 common names catalogued by language and country where the name is used, a prime example of traditional knowledge.*

*The database has four elements or 'levels'. The first is a commercial relational database, DataEase 4.5 which permits the easy development of applications that can be distributed without copyright restrictions. The second level is the so-called 'ichthyological structure', which assembles the different types of biological and ecological information into topic-specific tables or forms, e.g., on reproduction, eggs, larvae, population dynamics, nomenclature, introductions, etc. FISHBASE now consists of over 60 tables, each with 10-200 fields. The third level, the actual entry of data, performed exclusively at ICLARM headquarters, is done either by extracting information directly from the literature or from data collection forms sent by colleagues and/or collaborators. The fourth level is a collection of data analytical tools, i.e., routines that will permit checking and inter- and intra-specific comparisons of the data in FISHBASE.*

*The ichthyological structure in Level 2 enables FISHBASE staff to enter large amounts of information rapidly with a minimum of typographic and other errors; information is reduced to mostly numeric or categorical inputs which do not have large memory storage requirements. Moreover, this structure enables even complex searches for the information contained in the database to be performed straightforwardly.*

*A first (diskette) version of FISHBASE is available since September 1992 to collaborators and to experts who will check the information in the database. The second (CD-ROM) version is scheduled for release in late 1993, both in English and French, with annual updates, based on continued data entry at ICLARM headquarters.*

If traditional knowledge and the management systems based on it are to have any role in modern fisheries management, then there is an urgent need to record traditional knowledge. This was emphasized by Arizpe (1989) who stated that a 'massive

effort should be made, the world over, to record local and traditional knowledge ... using computers and ethnographic methods.'

The Pacific Islands are one of the world's greatest repositories of traditional knowledge (TK) related to fisheries and so can contribute in a major way to a database on this topic.

That such a task is not small we now know from ICLARM's two-year experience of developing FISHBASE, a computerized encyclopedia of biological data on the fishes of the world (Froese 1990; Pauly and Froese 1991; Froese et al. 1992). On the other hand, efforts can be combined. Thus, we recently realized that the basic structure of FISHBASE is compatible with TK. Thus FISHBASE can be used to achieve what Arizpe called for, at least as far as TK on fish is concerned (Palomares and Pauly 1992).

Incorporating TK related to fish into FISHBASE cannot be accomplished by fishery biologists alone, as they are often sceptical about the value of fishermen's and other TK. There is a need, therefore, to establish a multidisciplinary, international network of collaborators and contributors of TK to FISHBASE.

Members of this network will help FISHBASE project staff develop a table for entry of TK on fish into FISHBASE. Once this table is ready, entry of TK must then follow the rules set up for the other information in FISHBASE, i.e.:

—all information entered must be attributable to a published, verifiable source (not necessarily in peer-reviewed journals; these could be books, reports, theses, i.e., the so-called 'grey literature');

—information must refer to individual fish species or group of species, i.e., must not refer to 'fish' in general;

—information must be broken into relatively small units or choices, e.g., 'fish species X is used by ethnic group Y for either A, B, or C' ..., where A, B, etc. are choices described by standardized text fields with descriptions valid between species and ethnic groups.

ICLARM requests that all parties interested in cooperating with the FISHBASE project send copies of publications from which information can be extracted, pertaining to those areas of 'ethno-ichthyology' compatible with FISHBASE:

—**common names of fishes** (in any language). The common names fishermen use for fishes in their respective areas and languages most often give indications on the fish's body form, colour, habitat, behaviour and/or ecology (Palomares and Pauly 1992). Such lists exist for numerous areas of the South Pacific (Bagnis et al. 1972; Dalzell et al. 1991), and we anticipate that their incorporation into FISHBASE via the COMNAMES table illustrated in Fig. 1 will be useful for cross-cultural studies.

—**biology of fishes**, viz reproduction, migration, behaviour, etc. Information on the biology or ecology of a species from accounts by fishermen can be accommodated in other tables of FISHBASE. For example, knowledge of spawning aggregations of a species of groupers or the 'mokas' (*Plectropomus leopardus*) by the fisher-

Figure 1: FISHBASE form for common names of fish

<b>COMNAMES FORM</b>		<b>contributed by:</b> _____	<b>date:</b> _____
<b>Common name:</b> _____		<b>MainRef:</b> _____	
<b>Country:</b> _____	<b>Abbreviation:</b> _____	<b>C_code:</b> _____	
<b>Language:</b> _____ (see attached list for choices)			
<b>Remarks:</b> _____			
<b>Valid scientific name</b>			
<b>Species:</b> _____		<b>SpecCode:</b> _____	
<b>Family:</b> _____		<b>Checked:</b> _____	
<b>Stock code:</b> _____			

men of Palau (Johannes 1981) is incorporated in the REPRODUCTION table.

—information on fishing practices and the practical, religious and symbolic uses of various species, preferably disaggregated by gender (Chapman 1987) and age. TK related to fishing practices and fish uses is not straightforwardly incorporated into the present version of FISHBASE; appropriate adjustment cannot be done without the collaboration of experts in this particular field.

We thus call on all those interested to contact us at The FISHBASE Project, ICLARM, MC PO Box 2631, Makati, Metro Manila 0718, Philippines. Collaborators will be cited in FISHBASE as the supplier of the specific TK and will be sent, free of charge, a copy of the appropriate FISHBASE products (or of the package as a whole in case of major inputs).

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### Importance of community participation and customary knowledge for coral reef conservation highlighted at the 7th Coral Reef Symposium in Guam

by **Lafcadio Cortesi**,  
**Greenpeace Pacific Campaign,**  
**San Francisco, USA**

From June 23 to 26, 1992, more than 500 coral reef scientists, managers and policy-makers came together in Guam for the 7th International Coral Reef Symposium. In addition to a range of sessions on coral reef biology, monitoring and education, one session, 'Community-Based Coral Reef Management', focused on the effectiveness and appropriateness of empowering local communities with the authority and responsibility for managing the use of coral reef and coastal resources.

The session, organised by Greenpeace, brought together practitioners from eight countries to present and discuss their experiences of involving

communities in and developing collaborative government - community programs for the sustainable use and conservation of coral reef ecosystems. Presenters used their experience to demonstrate various methods for getting communities to participate in reef management, the effectiveness and appropriateness of community-based and collaborative coral reef management, the importance of marine tenure, practices and knowledge for sustaining reef ecosystems, the role of international NGOs and institutional requirements for community-based and collaborative management, the range of management challenges which could benefit from increased community responsibility and

authority, and the importance of monitoring and awareness for successful community-based management.

The session was chaired by Alan White of the University of Rhode Island's Coastal Resource Center. Bob Johannes of CSIRO emphasised the growing trend in the Pacific and elsewhere toward decentralisation of coral reef and coastal fisheries management functions. He reminded the audience that indigenous coral reef management systems and knowledge have been functioning for millennia with varying success in maintaining the ecological integrity of coral reefs, and that these systems provide the context within which management problems need to be understood and participatory solutions developed.

The information provided and lessons learned were new to many participants, as the session was the

first of its kind to be included in an International Coral Reef Symposium. These lessons, and several of the cases through which they were illustrated, will be published in a book 'Community-Based Coral Reef Management: Lessons from Experience', now being developed in collaboration by Greenpeace, University of Rhode Island Coastal Resource Center, and the Caribbean Natural Resource Institute. It is hoped to publish the volume in late 1993.

In addition, the session spurred the formation of an international network to facilitate information exchange, assist capacity development and generate support for community-based and collaborative coral reef management worldwide.

For further information, please write to Lafcadio Cortesi, Greenpeace Pacific Campaign, 139 Townsend St., San Francisco, CA 94107, USA.

### Conference on the science of the Pacific Island peoples

by **Bob Johannes,**  
**CSIRO,**  
**Hobart, Australia**

The value of traditional ecological knowledge (TEK) has been a well kept secret in modern societies and, until recently, has been all but ignored even by many professional natural resource managers. Happily, this is now changing. Even *Time Magazine* has got the message; its cover story (Sept. 23, 1991), entitled 'Lost Tribes, Lost Knowledge', brought the subject to international attention.

A somewhat more philosophical treatment of the subject is provided by the prominent environmentalists David Suzuki and Kenneth Knudtson in their book *Wisdom of the Elders*, published in 1992. They discuss the virtue of the widespread tribal view that the environment is a sacred system whose proper functioning requires that each species – including *Homo sapiens* – play its proper, humble role. (Christianity, in contrast, preaches environmental arrogance – humans are instructed to 'subdue' the earth and to 'have dominion over the fish of the sea,' a philosophy that has helped justify the environmental destruction that proceeds apace around the globe.)

Meanwhile, the growing profile of TEK in the Pacific Islands was reflected in the holding of the first-ever conference on the subject in the region in 1992. The conference on the Science of the Pacific Island Peoples, sponsored in part by the Government of France and the Sasakawa Peace Foundation (of Japan), was held at the University of the South Pacific in Suva, in early July.

Participants included not only biologists and social scientists, but also traditional healers and other Islander TEK experts, as well as philosophers, chemists, educationists, health specialist, linguists, Maori environmental activists, a regional planner, a politician, and a mathematician. Nine of the 65 papers presented concerned marine TEK, and quite a few others included some marine material.

Lamour Gina-Whewell described the traditional harvest and use of marine resources in the Solomon Island village in which she was raised, emphasising the importance of women, and Temawa Taniera described the information she obtained while studying traditional fisheries in some of the islands of Kiribati.

I described the strengths and weaknesses of both TEK and Western scientific knowledge for marine management, stating that a blending of the two would be more useful than either system in isolation. However, Marjorie Falanruw and Andrew Smith described cultural and environmental issues that make the combining of marine TEK and associated resource management with Western approaches a complex and difficult task in Yap.

Few studies of marine TEK are being carried out in the Pacific Islands, despite ever-increasing lip service being paid to their importance. In the meantime, priceless knowledge about the marine environment, knowledge found nowhere else, is vanishing as the old people who possess it die.

Why is so little being done when so many high-sounding resolutions are regularly passed at regional fisheries meetings concerning the importance of such work? Maybe some of our readers can throw some light on this question.

The proceedings of the conference will be published by the University of the South Pacific.

### Forthcoming changes to the legal status of traditional fishing rights in Fiji

by Tim Adams,  
South Pacific Commission,  
Noumea, New Caledonia

Fijian customary fishing rights have been legally recognised for the best part of a century. Indeed, the Fijian commercial reef and lagoon fishery has evolved entirely within the context of traditional fishing rights ownership. Whilst many countries are now looking at ways of re-potentiating traditional marine tenure systems, or even imposing new resource ownership systems on an already-developed commercial fishery, Fiji is one of the few countries in the world where the fundamental basis of such a concept is still in place and still strongly exercised.

There are over 200 legally-defined customary fishing rights areas, or *qoliqoli*, registered with the Native Lands and Fisheries Commission (NLFC) and these essentially cover every reef and lagoon in Fiji. Anybody wishing to fish commercially in Fiji (to catch fish by way of trade or business) must obtain a fishing licence from the Government, and anyone wishing to fish commercially in *demarcated areas* (areas subject to customary fishing rights, or *qoliqoli*) must first obtain the written permission of the registered owner of that area (usually the chief of the relevant coastal village), through the Divisional Commissioner, before the Government will issue a fishing licence.

This is an active, working system, and nearly 1,700 such community-sanctioned inshore fishing licences were issued in 1991. Communities also have the right to qualify their consent by excluding certain fishing gear types from being used, by prohibiting the catching of certain species, or by limiting fishing on certain sub-areas within the *qoliqoli*. Many communities have also exercised their legal option of appointing an *Honorary Fish Warden* to patrol their *qoliqoli*. Such wardens are unpaid and part-time, seeing this as a natural part of their traditional service to the community, but some of their costs may be subsidised out of *sevusevu*, or gifts, made to the community by fishermen seeking permission to use the *qoliqoli* at the start of each year.

The system is not without its problems, of course. One of the main problems in enforcing traditional measures in national law has been the difficulty of defining *qoliqoli* boundaries to a standard accept-

able by law. Indeed, such rigorous definition has been seen by many as being an unacceptable strait-jacket on what should be a dynamic and evolving customary system.

However, rigorous definition is a practical necessity for effective management. There are considerable financial returns to be made from the exploitation of certain inshore fisheries, and a purely traditional system cannot, without legal backup, cater for outsiders.

The Fiji Government Hydrographic Unit, together with the NLFC, is undertaking a long-term exercise to accurately survey *qoliqoli* boundaries. The existing system of dispute settlement, arbitration and registration through the NLFC is considered to give the system adequate flexibility to cope with any future changes.

Another problem lies in the differing concepts of marine spaces *ownership* between Fijian custom and British-derived law. The Fijian *vanua* concept embraces ties to the land and sea equally, whilst the law treats all of the sea-bed as State property and does not allow for marine spaces ownership either by the local community or by the individual.

Thus rural Fijian communities see fishing rights categorically as *ownership* rights, both of the geographical area of the *qoliqoli* and of the resources that it contains. But the law sees the geographical area of the *qoliqoli* as belonging categorically to the State, whilst the ownership of the resources it contains is somewhat confused. Some legal opinions state that fishing rights are *usage* rights to the resource only whilst others, pointing out the powers of management vested in the community (although, strictly speaking, these are powers to advise the Divisional Commissioner), opine that they are *ownership* rights over the resources.

Over the past few years there have been several different moves towards harmonising these conflicting ownership viewpoints and giving greater legal weight to the traditional concept. Many of these initiatives have stalled because of the delicate nature of the issue. Marine space ownership is

inextricably intertwined with land ownership, and is such a fundamental part of both Fijian law and society that any change has to be very carefully approached.

According to a news item in the *Fiji Times* of 25 November 1992, the Native Lands Trust Board is trying to increase integration of Fijian customary marine tenure with the legal system, by seeking more formal Fijian ownership of proposed Marine Park areas (see box).

The Ministry of Primary Industries in Fiji has the practical responsibility for controlling and managing all exploitation of the living resources within Fiji waters, and has plans to devolve even more of the responsibility for regulating inshore fisheries to the owners of traditional fishing rights, according to Ratu Tui Cavuilati, then Permanent Secretary of the Ministry, speaking at the 1992 Parkinson Memorial Lecture at the University of the South Pacific.

Ratu Tui drew attention to the fisheries for sedentary resources such as bêche-de-mer, trochus and pearl shell, giant clam, and mangrove crab which were showing stress and, in some cases, were grossly over-exploited. He said that Government was trying to educate people about the vulnerability of resources. He pointed out that the legal responsibilities of customary fishing rights were in urgent need of definition. Harassment of commercial inshore fishermen was becoming a major problem.

*Environment: Fiji*, the National State of the Environment Report, published by the Ministry for Housing and Urban Development of the Fiji Government in 1992, includes some discussion on the role of traditional fishing rights in conservation, and makes the point that any strengthening of traditional (extraction) rights must be balanced by the strengthening of traditional (resource management) responsibilities. The report says that "Increasingly, members of the ownership of a *qoliqoli* are becoming involved in business and, in certain cases, consider that the *qoliqoli* is simply a source of disposable income to be tapped for immediate gain, or to attract joint-venture partners".

### Ownership of fishing rights in the pipeline

(*Fiji Times*, 25/11/92)

*Moves are afoot to give landowners ownership of their fishing grounds, a divisional development committee was told.*

*Current legislation gives Fijian landowners the right to fish in such waters but not to own them. These currently belong to the state.*

*But a senior officer at the Native Lands Trust Board in Labasa, Peni Vaniqi, said the board was supporting a change in legislation.*

*He told the recent Northern Division Development Committee that instead of having the right to fish, landowners should have fishing ownership rights.*

*The change would allow landowners to benefit from the Board's tourism plan, he said.*

*Under the plan, the NLTB has singled out areas that could be turned into marine parks.*

*For the Northern Division, Rainbow Reef, off Dakuivuta in south eastern Vanua Levu, and Viani in Natewa Bay have been earmarked for this purpose.*

*"But landowners won't reap the benefits because they don't own the fishing grounds", Mr. Vaniqi said. "They will have to lease these from the State."*

*He said any changes to land laws however would have to be approved by Cabinet.*

Clearly, the application of traditional fishing rights in the modern world is fraught with pitfalls, but Fiji is a country which is actively coming to terms with the occasional problems that result. It is a continually evolving system that is well worth study for the examples it contains.

### Land and sea disputes in French Polynesia

Source: *Pacific Islands Monthly*  
(December 1992)

Endemic problems of indigenous land rights in French Polynesia were highlighted recently by a dispute between the Territorial Government and the Pomare Party about the island of Mopelia.

The Pomare Party began to file claims to the island of Mopelia in 1983 and has been occupying the land, first intermittently, and then permanently, ever since. Their removal became more pressing as

in 1991 the Territory granted land and maritime concessions on Mopelia to inhabitants of the neighbouring island of Maupiti who were keen to exploit these concessions. The Pomare Party's occupation was judged illegal by the local Appeals Court in July 1992, but no action was taken until September 1992 when members of the Pomare Party were expelled from the island.

The Minister of the Sea responsible for this affair, Edouard Fritch, argued that the Government had done everything in its power to reach a mutually agreeable solution with the Pomare Party. The Government had been willing to grant concessions to the Pomare Party if they lodged a formal application to the Mayor of Maupiti and ceased obstructing the Maupiti people's settlement of Mopelia.

The leader of the Pomare Party, Joinville Pomare, was opposed to the settlement of Mopelia for several reasons: firstly, because the Pomare family claimed to have ancestral rights to the land which the Maupiti people did not. Secondly, the Maupiti people had polluted their lagoon through water melon cultivation and associated pesticides and fertilizers, to such an extent that their lagoon was unfit for pearl farming, which they now wanted to undertake

at Mopelia (the Pomare Party was successfully cultivating pearls in the Mopelia lagoon and the Maupiti people decided to start a pearl farm at Mopelia as well).

Joinville Pomare argued that the Mopelia atoll was only 300 ha and its sensitive environment would not support the presence of 100 or more settlers from Maupiti. But one day after the removal of the Pomare Party, 100 people arrived in Mopelia from Maupiti, 87 of whom were to settle there. Members of the Pomare Party started a hunger strike in protest at their expulsion and to demand negotiations over their land claims. The demonstration captured the attention of the media and finally the two sides reached a verbal agreement that, in principle, the Pomare Party would be given a concession on Mopelia, the details of which were to be decided in further negotiations.

At the beginning of 1993, the situation was at a stalemate, but whatever the end results of the Pomare Party's land claims, until the controversial issue of indigenous land ownership is resolved, it will continue to pose problems for the Territory in terms of economic development, social cohesion and stability.

## Relearning coastal resource management from ancient Hawaiians

by K. Smith and M. Pai

(This article is reprinted with slight modifications from the April 1992 issue of Naga)

Isolated in the middle of the Pacific Ocean, Hawaii was one of the last areas to be reached by 'western' explorers and the last to become a part of the United States. As such, some ancient traditions were preserved in Hawaii well into the 19th and 20th centuries, providing an opportunity to learn from a surviving indigenous culture. Ancient Hawaiians believed that because the land, sea and everything in them were created by the gods, they must be cared for. 'No one must take more than they need, and everything must be shared.'<sup>1</sup>

'To conserve the supply of all resources was constantly in the Hawaiian mind. When plants were taken from the forest, some were always left to replenish the supply. Replanting was done without fail at the proper time as beds of taro and sweet potatoes were used. Fighting grounds were never depleted, for the fishers knew that should all the fish be taken from a special feeding spot (**ko'a**) other fish would not move in to a replenish the area... At the base of this action to conserve was the belief that the gods would have been displeased by greediness or waste.'<sup>2</sup>

Because of its importance to them, Hawaiians had many words for the land and all its formations. The word for land (**'āina**) had a much deeper meaning, derived from the word meaning 'to eat'. The words for the land zones (too numerous to mention) denote not only increasing distance from the mountain top and closeness to the sea, i.e., **mauka** ('towards the rise (mountain)') or **makai** ('towards the sea'), but also the changes in vegetation due to altitude and climate.

The largest unit of land was the island. Because they are naturally separated from one another, each of these islands could be referred to as an **'āina**, but the more common term was **mokuponi**. The lands were not divided in ancient times but as the island became crowded it was necessary to make additional subdivisions.<sup>3</sup>

These were the **moku'āina** (districts), **kalana** (similar to a **moku'āina**), **'okana** (divisions within **moku'āina** or **kalana**) and **ahupua'a**.

The **ahupua'a** were the smallest major divisions, which cut the islands into a series of pie-shaped

sections oriented in a **mauka-makai** direction. The figure below shows a schematic representation of a **moku'āina** divided into ahupua'a showing the **'ili'āina** and **mo'o'āina**, which allotted land for farming, fishing, and the elaborate system of traditional dwellings to families and larger groups. The **ahupua'a** spread out at the base along the shore and were self-sufficient units, affording to the chief and people 'a fishery residence at the warm seaside, together with the products of the high lands, such as fuel, canoe timber, mountain birds, and the right way to the same, and all the varied products of the intermediate land as might be suitable to the soil and climate of the different altitudes from sea soil to mountain side or top'.<sup>4</sup>

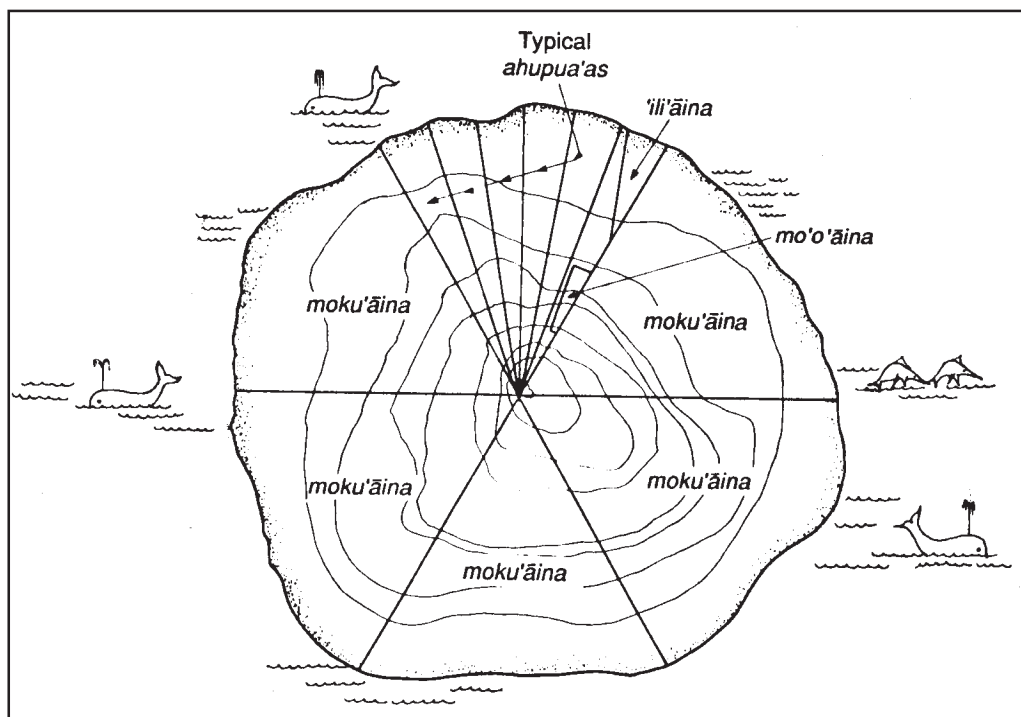
The Hawaiian philosophy and system of government promoted the fruitful and sustainable use of land and coastal areas. Under this system, the eight main Hawaiian Islands sustained a population estimated at from 250,000 to nearly one million people, depending upon the source<sup>5</sup>. The upper limits of ancient population estimates are comparable to the number of modern Hawaiian residents.<sup>6</sup>

Fishponds are a form of Hawaiian agriculture still existing today that exemplifies the balance between multiple land uses. The ponds were set off from the sea by walls of huge stones, expertly packed according to their size and shape without any form of cement.

These sturdy walls were permeable, allowing an interchange of water with the sea. Through this interchange, the balance of brackishwater in the ponds was maintained; and since water flowed around and through the walls, rather than just pounding against them, the fishponds were resistant to the destructive forces of erosion and wave action. Although they were not expressly designed for these purposes, fishponds also served as settling ponds, thereby reducing the loss of soils to the ocean and protecting the reefs from siltation. Building and maintaining fishponds was a group effort that drew the Hawaiian people together, and provided a source of food as well as a means of viewing fish up close where they could be appreciated.

Fishpond construction required sustained and intensive periods of labor, during which time farmers, fishers, woodsmen and others would cooperate to produce the structures that sustained an entire **ahupua'a**.

Harvesting large schools of fish was another task which required great effort and cooperation. The land agents with domain over the portion of reef directly **makai** of the **ahupua'a** directed fishing activity in this area. Fishing, like all other activities, had its strictly observed prohibitions or rules. These included rotating closed seasons and places for fishing, the reservation of certain fishes to the upper classes during all or part of the year (which had an effect comparable to that of modern quota systems), and the responsibility to lend a hand in some way when fish were abundant.



Schematic view of a moku'āina (island) subdivided into ahupua'a



Modern parallels to this ancient system are broken and irregular. Their structure can be traced to the gradual erosion and takeover of the sovereignty of the Hawaiian nation. The power of the kings and chiefs was concentrated to a single monarch whose government was overthrown. Thus, Hawaii became the land of sugar and pineapple plantations; and the ahupua'a system, which had survived more than sixteen centuries of Hawaiian rule disappeared into a system of private land ownership and inter-agency jurisdiction.

The reorganisation of the ahupua'a system marked the beginning of the decline of Hawaiian ecosystems. There was no longer a clear lineage and hierarchy of responsibility and caring for the conservation of land and water resources in a mauka-makai direction. Along a typical mauka-makai transect, ownership and jurisdiction is now interspersed between privates, City and County, State and Federal agents.

State Government is comprised of separate Offices, Departments and/or Divisions which manage Forestry and Wildlife, 'Water' Resources (water only), Aquatic Resources (living organisms, including fisheries), Land Management, Transportation, Boating, Harbors, (Native) Hawaiian Affairs, State Planning, (Human) Health, Business and Economic Development (including tourism), Agriculture, etc.

Boundaries run at all angles to the mountain, within which there are patches varying in ownership; but more often than not, jurisdiction is zoned along concentric circles which interrupt the mauka-makai connection.

The Cities and Counties are responsible for management of urban lands and the immediate shoreline. Within this realm, lands zoned for conservation are under State jurisdiction. State waters extend from the shoreline to within three miles of the coast, where Federal jurisdiction begins. Inland and inshore (within the bays and/or fringing reefs), and archipelago-wide pockets of Federal jurisdiction also exist. The resulting matrix of private, State, County and Federal responsibility within the ahupua'a defies the limitations of communication and inter-agency cooperation to maintain successful management and ecological balance. Elaborate networks of commissions, boards and committees have been established to oversee the various jurisdictions.

Although steps are being taken to remedy the present situation, Hawaii now ranks among the highest in the USA for its level of pollution, endangered species and disappearing habitats. These

problems will require a concerted and enduring effort over several decades if endemic ecosystems are to be revitalised and restored. More and more, the model for improved management is being sought in the revival of ancient traditions.

### Further reading

- <sup>1</sup> Kelly, M. (1985). Statement to the native Hawaiians study commission, p. 102-106. *In* Native Hawaiians study commission report. Hearings Commission on Energy and Natural Resources. U.S. Senate, 98th Congress, 2nd Session. Senate Hearing 98-1257, Pt. 1. Hawaii, April 17-20, 1984. US Government Printing Office, Washington DC.
- <sup>2</sup> Titcomb, M. (1952). Native use of fish in Hawaii. Originally published in 1952 as Memoir 29, Polynesian Society, Wellington, New Zealand. 2nd edition, 1972. University Press of Hawaii. 175 p.
- <sup>3</sup> Kamakau, S.M. (1839). The works of the people of old (Na Hana a ka Po'e Kahiko). Translated by M.K. Pukui. Bernice P. Bishop Museum Spec. Publ. No 61. (1976). Bishop Museum Press, Honolulu, 170 p.
- <sup>4</sup> MacKenzie, M.K., Editor. (1991). Native Hawaiian rights handbook. Office of Hawaiian Affairs/ Native Hawaiian Legal Corp. University of Hawaii Press. Honolulu. 320 p.
- <sup>5</sup> Stannard, D.E. (1989). Before the horror: The population of Hawai'i on the eve of western contact. Social Science Research Institute, University of Hawaii Press. 149 p.
- <sup>6</sup> Department of Business and Economic Development and Tourism (DBEDT). (1990). The state of Hawai'i data book: a statistical abstract. DBEDT Research and Economic Analysis Division, Statistics Branch Publ. No. HA 4007.H356.1990. 667 p.



**International Association for the Study of Common Property — Initial Call for Papers & Posters**

**Fourth Annual Common Property Conference (June 16–19, 1993, Manila, Philippines)**

*Conference Theme: "Common Property in Ecosystems under Stress"*

We invite the submission of proposals for scholarly talks, posters and panel discussions for the conference. We particularly encourage theoretical and panel discussions of common-property property rights regimes and the use and management of common-pool resources in ecosystems under stress. These may be defined as stress from a number of fundamental intervening processes or factors, such as natural and human-made disasters (including pollution and drastic changes in land use), population growth, commercialization, social and political upheavals, government intervention, transnational and local boundary conflicts, etc. The deadline for proposals is January 31, 1993. Early review and notification of organized sessions will be given to proposals received before the deadline.

**APPLICATION:** Please type or print on the form below or provide its equivalent in print or E-Mail. Also provide the information requested for paper, poster or session proposals as detailed on the reverse side of this announcement. Send to:

Dr. Villia Jefremovas  
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Please note that applicants are responsible for providing their own travel funds. The IASCP will try to help scholars from foreign countries to attend. Please write separately if funding is being requested.

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- (Check one): Want to  organise a session;
- to  organise a session and present a paper;
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- to  organise a panel discussion.

Please limit abstracts to a **maximum of 200 words** (about 1/2 page, single-spaced). All paper titles are limited to a **maximum of twelve (12) words**.

Paper title: \_\_\_\_\_

\_\_\_\_\_

Author(s) name(s): \_\_\_\_\_

\_\_\_\_\_

Author(s) affiliation(s): \_\_\_\_\_

\_\_\_\_\_

Abstract:

**Welcome to new members**

*by J.P. Gaudechoux,  
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The Traditional Marine Resource Management and Knowledge Special Interest Group is growing. We had received additional completed questionnaires from the individuals listed below. The previous list of members is available in the first issue of the SPC *Traditional Marine Resource Management and Knowledge Information Bulletin*.

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If you are on the list and your name and address is wrong, please send us a correction. If you are not on the list and would like to be, fill in the form enclosed with the bulletin or write to us for a new one.

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